



Water Quality

ANNUAL REPORT

To Our Customers

I am pleased to present you with this year's Annual Water Quality Report, providing you with information on where your water comes from, what is found in the water, the different types of treatment processes, and tips on efficient use of water.

While providing high-quality drinking water continues to represent the most important aspect of our work, we, as a water supplier, and you, our customers, are increasingly being called upon to identify and reduce excessive water use. We have long been an advocate of wise water use and have provided outreach and incentives to assist you in becoming more water-efficient. Despite these efforts, state policies are requiring increased controls to be placed on summertime residential water use—specifically lawn watering. Should Concord's voluntary program fail to reduce consumption to state standards, mandatory restrictions likely will be imposed during the summer when water demands are typically the greatest. Those of you making wise water choices must continue to make it a priority, and for those customers not yet practicing water conservation, now is a great time to start.

I hope you take the opportunity to read through the information on the following pages. As always, we appreciate your feedback and input, so please contact us if you have any questions or comments regarding this Report of our water system.

Respectfully,

Alan H. Cathcart,
Superintendent, Water/Sewer Division
Concord Public Works

CONCORD

WATER WORKS

2007 HIGHLIGHTS

- A \$34,475 grant was awarded by the Massachusetts Department of Environmental Protection to fund water conservation measures in town buildings.
- The Nagog Pond water supply was used from May to early September. Due to its high level of water quality, the Town continues to operate this source under a filtration waiver, one of only a few public water systems in the United States meet these stringent requirements.
- Maintenance activities were performed at the historic c.1883 Nashawtuc Reservoir gatehouse. This work included repairs to the stairs and railings, re-pointing of the masonry, grading of the slope, and minor structural repairs to the building.
- 12,187 feet of water transmission main was installed, connecting the Deaconess treatment facility to the White Pond well. In conjunction with this project, approximately 2,410 feet of water main was replaced along Nut Meadow Crossing and Peter Bulkeley Road.

Water Supply

Concord’s water system consists of six groundwater supply wells located in Concord and one surface water supply located on the Acton/Littleton town line. In addition, it has associated pumping stations, two storage reservoirs with a 7.5 million gallon total capacity, approximately 130 miles of water main, and 1,248 fire hydrants. Depending on the season, all available production facilities may be called upon to satisfy system demands which may fluctuate between 1.5 million gallons per day (MGD) during the winter months to over 4 MGD in the summer. Concord’s public water system is interconnected with Acton and Bedford for emergency backup, if ever needed.

Water Treatment

In accordance with state and federal drinking water requirements, Concord’s water is treated before it gets to your tap. Treatment includes: *disinfection*—via the addition of liquid chlorine at all groundwater supplies and ozone/UV light plus chlorine gas at the Nagog Pond water supply; *corrosion control*—via the addition of potassium hydroxide and polyphosphate to raise the natural pH of the water and reduce its corrosiveness to household plumbing; *fluoridation*—via the addition of sodium fluoride to help in the prevention of tooth decay; *iron sequestration*—performed by adding polyphosphate to reduce the frequency of discoloration events; and *iron and manganese removal*—performed by pressure filtering the Deaconess and White Pond wells.

Potential Sources of Contaminants

Sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it will dissolve naturally occurring minerals and, in some cases, radioactive material, and can pick up other substances resulting from the presence of animals or human activities. Contaminants that might be expected in untreated water include: biological contaminants such as viruses and bacteria; inorganic contaminants, such as metals and salts; pesticides and herbicides;

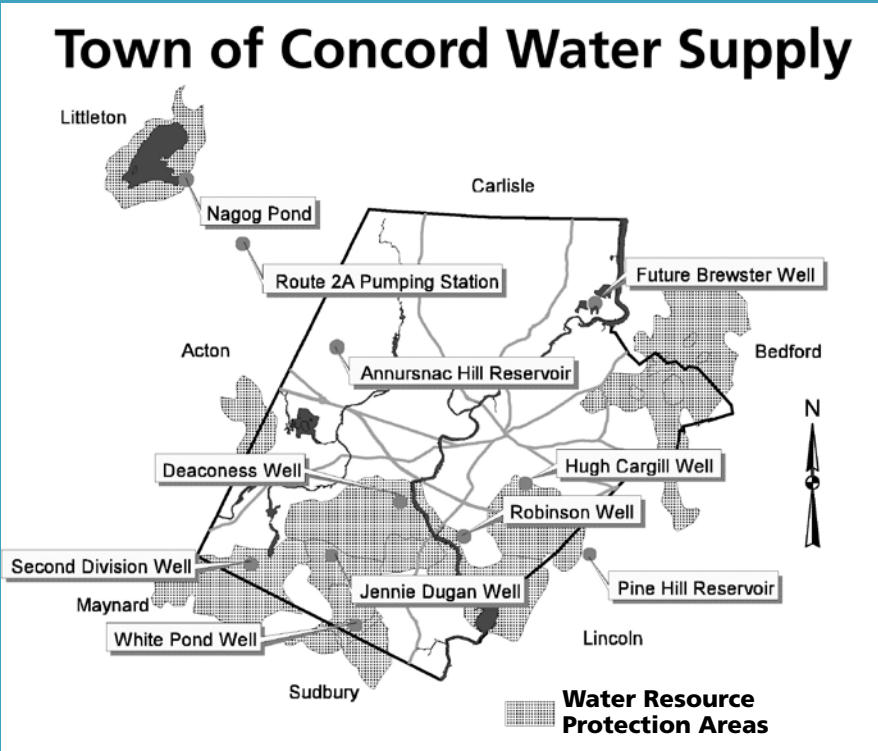
organic chemicals from industrial or petroleum use; and radioactive materials.

Drinking water, including bottled water, may reasonably be expected to contain at least some small amounts of certain substances which the EPA calls “contaminants”. The presence of these substances does not necessarily indicate that the water poses a health risk. For example, naturally occurring dissolved minerals are commonly found in well water. More information about the substances found in drinking water and their potential health effects can be obtained by calling the EPA’s Safe Drinking Water Hotline at 1-800-426-4791 or the Massachusetts Drinking Water Program at 1-617-292-5770.

Quality Control

To ensure that tap water is safe to drink, the EPA enforces regulations that require stringent monitoring of specific contaminants within public water supply systems. Within Concord’s system, over 500 tests are run each year to assess approximately 145

continued on page 7



SOURCE TREATMENT

	Nagog Pond Acton, MA	Second Division Well	Deaconess Well	Robinson Well	Jennie Dugan Well	White Pond Well	Hugh Cargill Well
Potassium Hydroxide to Adjust pH for Corrosion Control	•	•	•	•	•	•	•
Ultra Violet Light for Disinfection	•						
Chlorine for Disinfection	•	•	•	•	•	•	•
Ozone for Disinfection	•						
Fluoride to Promote Strong Teeth	•	•	•	•	•	•	•
Polyphosphate for Iron & Manganese Treatment and Corrosion Control	•	•	•	•	•	•	•
LayneOx™ Pressure Filtration for Iron & Manganese Removal			•			•	

Water Quality Summary

Listed below are the substances detected in Concord's drinking water in 2007. The presence of these substances does not necessarily indicate that the water poses a health risk. These substances are divided into 3 categories, Primary, Secondary, and Lead & Copper Parameters. Primary parameters protect drinking water quality by limiting the levels of contaminants that can adversely affect public health and are known or anticipated to occur in public water systems. Secondary parameters are set for aesthetic purposes and are designed to assist the EPA in determining their occurrence in drinking water and whether future regulation is warranted. Not listed are over 130 substances we tested for but did not detect. All substances listed below are in units of ppm (parts per million) unless otherwise noted.

PRIMARY PARAMETERS

Substance	Highest Level Detected	Range of Levels Found	Highest Level Allowed (EPA's MCL)	Ideal Goal (EPA's MCLG)	Major Sources in Drinking Water
Barium	0.012	ND-0.012	2	2	Erosion of Natural Deposits
Bromate	0.0034	0.0022-0.0034	0.010	0	By-product of drinking water disinfection
Chlorine	2.7	0.04-2.7	4 (MRDL)	4 (MRDLG)	Water treatment for disinfection
Chromium	0.003	ND-0.003	0.1	0.1	Erosion of Natural Deposits
Fluoride ¹	1.25	ND-1.25	4	4	Water treatment for tooth decay prevention
Haloacetic Acids (ppb)	14.12 ²	ND-48	60	No Standard	By-product of drinking water disinfection
Nitrate	1.9	0.12-1.9	10	10	Runoff from fertilizer use; Erosion of natural deposits
Radium 228 (pCi/L)	1.7	ND-1.7	5 ³	No Standard	Erosion of natural deposits
Trihalomethanes (ppb)	24.6 ²	0.88-66.5	80	No Standard	By-product of drinking water disinfection
Turbidity (NTU) ⁴	0.92	0.15-0.92	5	1	Suspended matter from soil runoff

SECONDARY PARAMETERS

Calcium	25.3	5.6-25.3	No Standard	No Standard	Erosion of natural deposits
Chloride	116	19.9-116	250	250	Naturally present in the environment
Hardness	96	19-96	No Standard	No Standard	Erosion of natural deposits
Iron	1.0	ND-1.0	0.3	No Standard	Erosion of natural deposits
Magnesium	8.0	1.2-8.0	No Standard	No Standard	Erosion of natural deposits
Manganese	0.071	ND-0.071	0.05	No Standard	Erosion of natural deposits
Methyl Tertiary-Butyl Ether (ppb)	0.93	ND-0.93	No Standard	No Standard	Fuel Additive
Nickel	0.001	ND-0.001	No Standard	No Standard	Erosion of natural deposits
Potassium	47	6.6-47	No Standard	No Standard	Naturally present in the environment
Sodium	21.1	ND-21.1	No Standard	No Standard	By-product of drinking water treatment; Naturally present in the environment
Sulfate	33.3	3.9-33.3	250	No Standard	Naturally present in the environment
Total Dissolved Solids	334	124-334	500	500	Naturally present in the environment
Zinc	0.057	0.027-0.057	5	No Standard	Naturally present in the environment

LEAD & COPPER PARAMETERS⁵

Substance	90 th Percentile Level Detected	Range of Levels Found	90 th Percentile Action Level (EPA's MCL)	Ideal Goal (EPA's MCLG)	Major Sources in Drinking Water
Lead (ppb)	2	ND-31	15	0	Household plumbing, see statement below
Copper	0.31	0.04-0.35	1.3	1.3	Household plumbing, see statement below

TERMS & ABBREVIATIONS

Action Level: The concentration of a contaminant that, if exceeded, triggers treatment or other requirements, which a water system must follow.

MCL: (Maximum contaminant Level) The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLG's as feasible using the best available treatment technology.

MCLG: (Maximum Contaminant Level Goal) The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLG's allow for a margin of safety.

MRDL: (Maximum Residual Disinfectant Level) The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG: (Maximum Residual Disinfectant Level Goal) The level of a drinking water disinfectant below which there is no known expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

ppb: parts per billion or micrograms per liter

ppm: parts per million or milligrams per liter

ND: none detected

1) **Fluoride:** The Department of Public Health's ideal goal for fluoride is 1 ppm.

2) **Haloacetic Acids and Trihalomethanes:** The highest level detected represents the highest running annual average for these contaminants. The range of levels found may have results in excess of the MCL but the running annual average of all sample locations is used to determine compliance.

3) **Radium 228:** The 5 pCi/L standard is for combined results of Radium 226 and Radium 228.

4) **Turbidity:** Turbidity is a measure of the cloudiness of the water. We monitor it because it is a good indicator of water quality and the effectiveness of disinfectants.

5) **Lead and Copper:** In accordance with EPA regulations, Concord Public Works tests the tap water of 30 homes in Concord for lead and copper every 3 years. Testing was last done during August and September 2005 and is next scheduled for completion during the summer of 2008. EPA determines whether the protection against corrosion is sufficient by requiring that at least 90% of the sampled homes have lead levels under 15 parts per billion (ppb). This is called the Action Level.

Important Information From EPA About Lead: Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home may be higher than other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested. Additional information is available from the Safe Drinking Water Hotline (800-426-4791).

Water Conservation

Concord's water use in 2007 was up over 2006, due primarily to a dry late summer and fall. By looking at the charts to the right depicting water use and precipitation from the last two years, you can see how the Town's water consumption remains fairly consistent during the winter months, but varies in the summer based on the amount of rainfall we receive.

The state Department of Environmental Protection (DEP) is looking closely at public water suppliers' summer water use, in particular how much residents use. The DEP has adopted new regulatory guidelines that suppliers like Concord would need to adhere to if certain standards are not met. One such standard is called "Residential Gallons Per Capita Day, (RGPCD)" or in other words, how much water each resident uses in a day. The threshold established by DEP is 65 gallons; in 2007 Concord's RGPCD was 68. If we continue to exceed that standard, the state is likely to require the Town to adopt mandatory outdoor watering restrictions under certain conditions.

However, there is good news. Over the past decade, you, our customers, have changed water use habits and installed water-efficient appliances to the extent that average residential use the last five years is 12 percent lower than the previous five years' average.

While progress has been made, more can be done:

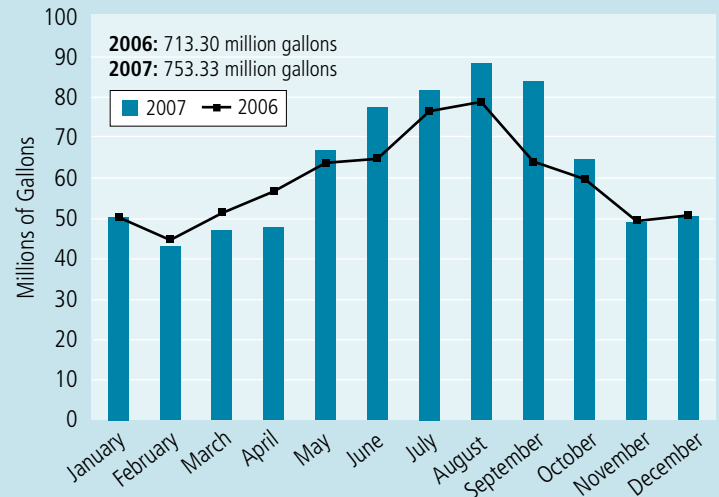
- In-ground irrigation system owners need to make sure their systems are maintained and operating properly. Find a certified contractor at www.irrigation.org.

Seasonal Rates Start May 1

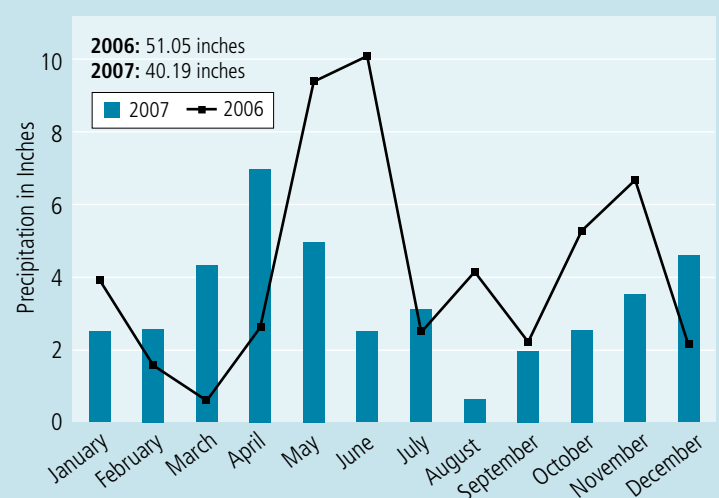
Concord's Water Conservation Rate is in effect each year between May 1 and October 31 for residential customers. Water customers using more than 2,400 cubic feet of water bimonthly (more than 300 gallons daily) pay higher rates for their extra consumption, reflecting the higher cost of meeting peak water demand. Below are proposed rates, effective June 1, subject to Public Works Commission approval. One hundred cubic feet = 748 gallons.

Base Rate: \$3.72 per 100 cubic feet (ccf) bimonthly.
Step 2: \$7.06 per ccf for 2,500 – 4,800 cubic feet bimonthly May 1 through October 31.
Step 3: \$9.28 per ccf over 4,800 cubic feet bimonthly May 1 through October 31.

2006–07 Water Use Comparison



2006–07 Precipitation Comparison



- According to Town Bylaw, all irrigation systems must have an operable rain sensor that is located in a spot where it can be reached by rainfall (not under an eave).
- Lawns don't need to be watered every other day. In most weather conditions, once or twice a week is usually sufficient.
- Concord's relatively older housing stock means there are still a lot of old 3 to 5 gallon per flush toilets out there. Since toilets are the top water user inside the home, replacing them with new models will reduce water use, prolong the life of your septic system, and cut sewer bills for those with sewer service. This is a great time to take us up on our double rebate offer.

You are encouraged to take advantage of all the opportunities and programs offered. Make this the year you join the Conservation Challenge, attend a Sustainable Landscaping class or replace that leaky toilet.

Opportunities for Learning

All of the workshops listed below are free and open to the public. To ensure adequate materials are available, please register by calling 978-318-3259 or by emailing joanneb@concordma.gov. Funding for these workshops is provided in part by the Massachusetts Environmental Trust.

Water and Energy Conservation 101, 10:30 a.m., Wednesday, April 23, at the Harvey Wheeler Community Center at 1276 Main Street in West Concord. Presented by Water Conservation Coordinator Joanne Bissetta and John Odell, Energy Services Administrator from Concord Municipal Light Plant, you will learn about water and energy saving appliances, how to check for leaks and simple things you can do to cut utility bills. Bring your questions!

Sustainable Lawn Care, 7–8:30 p.m., Wednesday, May 7, at CCHS. Come hear from U-Mass Extension Turf Expert Mary Owen about the best management practices to cultivate a healthy lawn with minimal environmental impacts.

Naturally Beautiful Landscapes, 7–9 p.m., Tuesday, May 13, at CCHS. Learn how to reduce maintenance and water use by incorporating native, low-water use plants into your landscape. Discover the importance of the “right plant in the right place,” the benefits of compost and the value of healthy soil. Presented by

For Concord Water Customers

Rain Barrel Only \$55.00*

Collect rainwater for
your garden and plants

Order online at
www.skyjuice.us.

Order by May 14

Pick up rain barrels at CPW,
135 Keyes Rd. on Wednesday, May 21



* Discount offer limited
while supplies last

Donald Bishop, landscape consultant and owner of “Gardens Are...” a Marlborough-based organic landscaping and design business.

Irrigation Systems 101, 7–9 p.m., Tuesday, May 20 at CCHS. Certified irrigation auditor and contractor Ted Moriarty from the Smart Watering Company will guide you on how to properly maintain your irrigation system for maximum watering efficiency. Learn how to use your controller and develop an optimum watering schedule as well as easy do-it-yourself repairs.

Join the Community Conservation Challenge

Applications are still being accepted from community groups and individuals interested in joining the Community Conservation Challenge, an outreach campaign sponsored by Concord Public Works (CPW) and the Massachusetts Environmental Trust that links water conservation with fundraising by local community/school organizations

The Community Conservation Challenge will raise awareness about the importance of water efficiency by providing an incentive to water customers to save water. Participating water customers that use less water this summer will earn funds for local organizations that they care about.

Local groups such as civic organizations, business groups, school groups and others are eligible to participate. CPW will help participants learn how to become more water-efficient by offering workshops,

water use audits, toilet replacement rebates and more. If successful at reducing their water use, groups can earn up to \$1,000.

All Concord water account holders are able to participate; you can join an existing group or get some of your friends and neighbors to sign up. Go to www.ConservationChallenge.org for more information or contact Water Conservation Coordinator Joanne Bissetta at 978-318-3259 or joanneb@concordma.gov for more information.

The town received a \$31,000 grant from the Massachusetts Environmental Trust to conduct the Challenge. Grant funds are derived primarily through the sales of the Trust's environmental license plates.



**Community
Conservation
Challenge**

Residential Hot Water Heater Maintenance

Discolored water in your home can originate from the Town's water distribution system or your home. If you do notice a discoloration in freshly drawn hot water in your sink or bathtub, try refilling the sink or tub with about three inches of cold water. If the cold water is clear, you need to flush your hot water tank. This helps remove sediment and minerals that collect on the bottom of the tank. Many calls received by the Water and Sewer Division are related to hot water being yellow or brown in color.

Many manufacturers suggest flushing hot water tanks at least once a year. We recommend doing this twice a year due to the iron content of our groundwater supplies. The treatment facility built his past year should improve water quality throughout Town and

therefore annual flushing may be sufficient. Regular flushing will not only decrease the possibility of discolored water, it will also extend the life of your hot water tank and potentially reduce your energy costs.

Handouts detailing how to flush your hot water tank are available at the Water and Sewer Division office at 135 Keyes Road and can be downloaded from the Water and Sewer web page at www.concordma.gov. If you have an owner's manual for your particular model, please follow the directions the manufacturer provides. If you have any problems following flushing procedures or do not feel comfortable doing it yourself, you should contact a plumber. Also, please contact us at 978-318-3250 if your water is still discolored after flushing.

SPECIAL OFFERS! ACT NOW!

Thanks to a grant from the Massachusetts Department of Environmental Protection, Concord water customers who upgrade old water-guzzling toilets or clothes washers are eligible for rebates.

For a limited time, toilet rebate amounts have been DOUBLED to \$100 for a conventional 1.6 gallon per flush toilet, and \$250 for a High-Efficiency Toilet. Toilets being replaced must be 20 years old and older and the new toilet cannot be part of a larger bathroom renovation project. Only models on the Uniform North American Requirements for toilets are eligible for rebates.

Customers installing high-efficiency clothes washers are now eligible for a \$100 rebate from Concord Water. Eligible washers must be listed at Tier 2 or Tier 3 on the Consortium for Energy Efficiency appliance list. These washers are more water- and energy-efficient than Energy Star machines and are also eligible for a rebate from the Concord Municipal Light Plant.

For our commercial and institutional water customers, free comprehensive water use assessments and free replacement of older, high water using pre-rinse spray valves are now available.

Concord Water is conducting water efficiency outreach to institutions and businesses in the food service industry. The water use assessments are conducted by a qualified, independent contractor who provides you with an action plan to reduce water use and wastewater production at your facility. These voluntary action plans focus on ways your business can save money. In addition, the contractor will install a water-efficient pre-rinse spray valve at no extra charge.

Depending on the size of your facility, you can save over \$1,000 every year in energy, water and sewer bills by replacing your inefficient spray valve.

Funding for this initiative is provided in part by a grant from the Massachusetts Environmental Trust. Funds are limited; assessments and spray nozzle installations are available on a first-come first-serve basis.

For more information, rebate instructions, forms, and the list of eligible toilets and clothes washers, go to www.concordma.gov or call 978-318-3259.



Projected Savings with Nozzle Retrofit

Electric Hot Water Heating Example (2 hrs/day)	New Spray Nozzle	Old Spray Nozzle	Savings
Flow Rate (gpm)	1.28	3	1.72
Annual Water Consumption (gal)	46,080	108,000	61,920
Annual Water Consumption (units)	62	144	83
Annual Water Heating Energy (kWh)	8,285	19,418	11,133
Annual Water Cost	\$222.39	\$521.23	\$298.84
Annual Sewer Cost	\$466.34	\$1,092.99	\$626.65
Combined Water and Sewer Cost	\$688.74	\$1,614.22	\$925.49
Annual Water Heating Cost	\$497.11	\$1,165.10	\$667.99
Overall Annual Cost	\$1,482.31	\$2,779.33	\$1,593.48

continued from page 2

potential contaminants. We are proud to report that Concord's water quality testing program not only meets EPA's requirements for drinking water but goes above and beyond those requirements to satisfy the higher standards we have set for ourselves. Additional water quality information and explanations of our monitoring programs are available at www.concordma.gov.

Drinking Water and People with Weakened Immune Systems

Some people may be more vulnerable to contaminants in drinking water than the general population. People with weakened immune systems such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly people, and infants can be particularly at risk from infections.

These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the EPA's Safe Drinking Water Hotline at 1-800-426-4791.

Get Involved

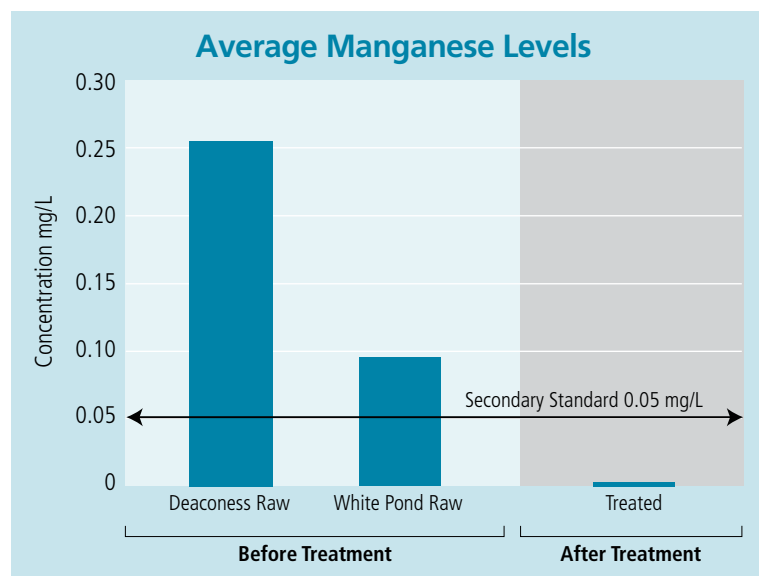
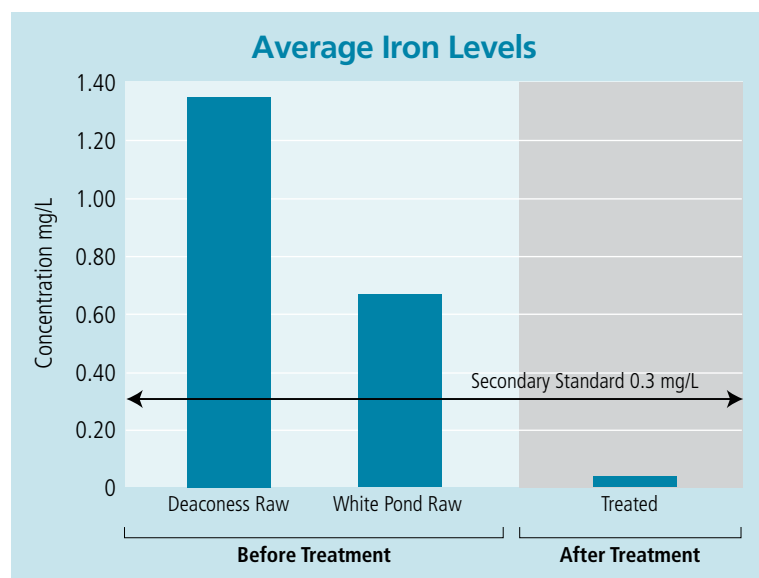
The Public Works Commission is the overseeing body of CPW and their meetings provide an opportunity to become more involved in issues relating to the water system. They typically meet the second Wednesday of each month at 7 pm. Please check the CPW website for exact dates and location. For more information regarding water quality and resource protection initiatives, or if you have a neighborhood concern in a resource protection area (depicted on map on page 2), please contact Matthew Mostoller, Environmental Analyst at 978-318-3250 or mmostoller@concordma.gov.

Water Quality

Iron and Manganese Removal

During the late summer and early fall, the new treatment facility on Old Road to Nine Acre Corner began treating water from two wells located in the southern part of Concord. Preliminary operation of this facility began in July and once a water transmission main was completed between the Deaconess and White Pond wells, water operators were able fully test the facility's capabilities. Both of these wells had elevated levels of iron and manganese which are responsible for discolored water, staining, and some particulates. These are both naturally occurring compounds found in the groundwater sources that help supply Concord's water system.

This plant currently is producing up to one million gallons per day of treated water. Typically, 95% percent of the iron and 100% of the manganese are being removed through adsorption and filtration provided by the LayneOx™ treatment process. This provides a direct benefit to many customers who have endured staining and discoloration in years past. The removal of iron and manganese allows us to meet standards designed to help maintain aesthetic properties of the water. The graphs on this page depict the monthly average levels of iron and manganese from October 2007 through March 2008, prior to and after filtration with the secondary standards for aesthetics shown.



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Water/Sewer Division
PWS ID 3067000
135 Keyes Road
Concord, MA 01742



Free Water Conservation Devices

Concord Public Works wants to help you conserve water. Stop by our office at 135 Keyes Road weekdays 7:30 a.m.–4:00 p.m. or call Joanne Bissetta, Water Conservation Coordinator, at 978-318-3259.



Rain Gauge – Keep track of rainfall to avoid over-watering your lawn.

Leak Detection Kit – A simple test to determine if you have a leaky toilet.



Bathroom Flip Aerator – Temporarily halt the flow of water with a flip of the switch without readjusting temperature controls. Great for shaving and brushing teeth.

Dual Setting Flip Aerator with Swivel for the Kitchen – A swiveling aerator that has a full flow for filling pots, a wide spray for rinsing fruits and vegetables, and a flow restrictor for use when washing dishes.



Low-flow Showerhead – An attractive, high-quality showerhead that uses 2.0 gallons per minute that doesn't feel "low-flow." Cut your shower water use in half.

"Water Miser" Garden Hose Nozzle – Enjoy watering your garden with this six-spray pattern nozzle that ranges from a fine mist to a high-powered spray.

Shower Timer – Helps you keep your showers to five minutes.

Presentations to Local Groups

Concord Public Works staff is available to come to your organization to talk about water resource protection and conservation. Give us a call!